

**Grade 2/ Unit 1: Structure and Properties of Matter**  
**First Marking Period**

**Curriculum**

**Course Description:** This unit is divided into three parts or “bends” that will help students understand that all matter has observable characteristics and that the structure of matter affects the properties and uses of materials. The final bend will challenge students to synthesize their knowledge and what they have learned from their experiences to solve an engineering design problem in a culminating building task.

Bend 1- States of Matter--What properties do common objects Have? How can we organize materials to help us make sense of what we Observe? What are some ways that different matters behave?

Bend 2- Changes in Matter Can matter change it state? What causes matter to change? Can matter be changed and then change again?

Bend 3 Building Challenges--collecting, testing and applying evidence using materials for an intended purpose--How can we use the engineering design process and our new understanding about matter to apply materials for an intended purpose?

**Big Ideas: Course Objectives / Content Statement(s)**

By the end of this unit, students will know:

- Properties of matter such as strength, hardness, flexibility and texture.
- What materials are best suited for different purposes.
- An object built out of a small set of pieces can be deconstructed and built into a different object.
- Properties of solids, liquids, and gas.
- Some substances can experience reversible changes and some cannot.

<b>Essential Questions</b>	<b>Enduring Understandings</b>
<p><i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <ul style="list-style-type: none"><li>● How can matter in our everyday world be sorted and classified by its observable properties and characteristics.</li><li>● How does matter change?</li><li>● What are some ways that matter behaves? How do environmental conditions influence a state of matter?</li><li>● How do you determine which materials have the properties that are best suited for an intended purpose?</li></ul>	<p><i>What will students understand about the big ideas?</i></p> <p>Students will understand that...</p> <ul style="list-style-type: none"><li>● Matter can be described and categorized by observed properties such as flexibility, strength and hardness.</li><li>● Matter can behave differently, be solid or liquid depending on temperature.</li><li>● Simple tests can be designed to measure properties of matter to determine which material is best suited for different purposes.</li></ul>

<ul style="list-style-type: none"> <li>• What is everything made of?</li> <li>• How are liquids and solids different?</li> <li>• How are materials used for different purposes?</li> <li>• What happens when certain materials are heated and/or cooled?</li> </ul>	<ul style="list-style-type: none"> <li>• Some matter can be changed by reversible processes and some cannot.</li> <li>• All human made products are a result of applying knowledge of matter from the natural world.</li> <li>• The engineering design process can be used to design various solutions for challenges, such as safe shelters, boats that float, and stronger structures.</li> </ul>
<p><b>Areas of Focus: Proficiencies (Cumulative Progress Indicators)</b>  Students will:  <i>(Enter NJCCCS or Common Core CPI's here)</i></p> <p>Students who demonstrate understanding can:</p> <p><b>2-PS1-1</b> Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]</p> <p><b>2-PS1-2</b> Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]</p> <p><b>2-PS1-3.</b> Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]</p> <p><b>2-PS1-4.</b> Construct an argument with</p>	<p><b>Examples, Outcomes, Assessments</b>  <i>(see <a href="#">note</a> below about the content of this section)</i></p> <p>Instructional Focus:  By the end of this unit, students will be able to:</p> <ul style="list-style-type: none"> <li>• Determine different properties of objects.</li> <li>• Group objects according to their properties.</li> <li>• Construct an object out of a small set of pieces.</li> <li>• Conduct experiments to change the state of liquids and solids .</li> <li>• Design and test a solution for a building challenge using knowledge about the different properties of various materials</li> </ul> <p>Sample Assessments:</p> <p>Search for and classify matter in the environment</p> <p>Observe and describe the properties of matter</p> <p>Classify matter according to their properties.</p> <p>Comparing and contrasting matter</p> <p>Graphic organizers (before/during/after, cause/effect)</p> <p>Quizzes</p>

evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

Quick writes

Pictures/drawings

Applying tests, investigating, and reporting

Debates re: reversible change or not, or effectiveness of design solution citing notes/evidence from science journal

**After:**

Science experiment/fair based on rubrics formed from essential questions)

**Instructional Strategies:**

- Mini lecture utilizing multimedia presentation
- Notetaking with words and sketches
- Mini debates using collected evidence
- Cooperative groupwork engaged in engineering design process
- Lab activities observing, measuring, recording changes in matter and observing/describing properties of matter

**Interdisciplinary Connections**

**Reading and Writing:**

**RI.2.1** Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-PS1-4)

**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4)

**RI.2.8** Describe how reasons support specific points the author makes in a text. (2-PS1-2), (2-PS1-4)

**W.2.1** Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4)

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1), (2-PS1-2), (2-PS1-3)

**Math:**

**MP.2** Reason abstractly and quantitatively. (2-PS1-2)

**MP.4** Model with mathematics. (2-PS1-1), (2-PS1-2)

**MP.5** Use appropriate tools strategically. (2-PS1-2)

**2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1), (K-2-ETS1-3)

**Social Studies--**

Human design and choice of materials can be affected by economic factors such as supply and demand, resource allocation and price and amount of funding.

6.5.A.4. Explain what it means to 'save' money.

6.5.A.2. Explain how the products individuals eat, wear, and use impact their health and safety and the environment

	<p>6.6.E.1. Describe the role of resources such as air, land, water, and plants in everyday life. 24</p> <p>6.6.B.2. Describe the physical and human characteristics of places. 11</p> <p><b>Technology Integration</b></p> <p><b>Examples:</b></p> <p>Create simple table with excel on chromebook to record measurements of flexibility, hardness and other properties</p> <p>Use digital camera/laptop camera to photograph design solutions , record changes in matter</p> <p>Multi media presentations of phenomena changes in matter</p> <p><b>Global Perspectives--</b></p> <p>Human made solutions for structures often depend on the availability of materials found in the local geographic area. Humans adapt the use of different materials dependent upon what is available and what is needed based on the type of environment (climate, geography economy).</p>
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NOTE re: Examples, Outcomes and Assessments  
*The following skills and themes should be reflected in the design of units and lessons for this course or content area.*

- 21st Century Skills:
- Creativity and Innovation
  - Critical Thinking and Problem Solving
  - Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content  
area):

Financial, Economic, Business, and  
Entrepreneurial Literacy

Civic Literacy

Health Literacy

**Grade 2/ Content Area:** Unit 2 Processes that Shape the Earth  
**Length of Course: (HS/MS ONLY)**

**Curriculum**

**Course Description:**

This unit is divided into three parts or “bends” that will help students understand that the earth has dramatically different landscapes and geological features and that these unique landscapes are created by changes in the earth’s crust, weather and erosion cycles. Students will also learn that changes in the earth’s crust and it’s landscapes can occur both very quickly and very slowly over time. The final bend will challenge students to synthesize their knowledge and what they have learned from their experiences to use the engineering design process to design, test and present a solution for erosion at their school site or other given site.

**Big Ideas:** *Course Objectives / Content Statement(s)*

By the end of this unit, students will be able to:

- Describe what a cycle is and give examples.
- Describe events that have a beginning and an an end.
- Describe events that happen quickly.
- Describe events that happen very slowly.
- Explain how wind shapes the land.
- Explain how water shapes the land.
- Describe how wind erosion is reduced
- Describe how water erosion is reduced.
- Design, build, test and compare engineering solutions for preventing/limiting wind and water erosion.

<b>Essential Questions</b>	<b>Enduring Understandings</b>
<p><i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <p>Does the Earth’s surface change? What are ways that the Earth’s surface changes? What are the agents of change? Do changes in the Earth’s surface happen quickly or slowly? Can humans stop Earth’s surface from changing? Bend 1: • What causes the Earth to change?  • Do all of Earth’s changes take the same amount of time to happen? Why or why not?</p>	<p><i>What will students understand about the big ideas?</i></p> <ul style="list-style-type: none"><li>● Be able to describe events occur in cycles, such as day and night.</li><li>● Identify events have a beginning and an end, like a volcanic eruption.</li><li>● Explain the impact of events can happen very quickly.</li><li>● Describe events can happen very slowly over a time period much longer than anyone can observe.</li><li>● What the effects of wind and water are on the land.</li><li>● How wind erosion creates landforms</li><li>● How water erosion creates landforms</li></ul>

<p>Bend 2:</p> <ol style="list-style-type: none"> <li>1. What are the effects of wind &amp; water on the land?</li> <li>2. What are landforms that help prevent wind and water erosion?</li> <li>3. How does wind and water shape the land?</li> </ol> <p>Bend 3:</p> <ol style="list-style-type: none"> <li>4. How can the effects of wind and water erosion be controlled or reduced?</li> </ol> <p>How can man made materials/structures be used to impact the natural world?</p> <p>How do we use engineering design to solve problems involving erosion?</p>	<ul style="list-style-type: none"> <li>• Humans can use the engineering design process to test and compare simple solutions for preventing or limiting the effects of wind and water erosion</li> </ul>
<p><b>Areas of Focus: Proficiencies (Cumulative Progress Indicators)</b>  Students will:  <i>(Enter NJCCCS or Common Core CPI's here)</i></p> <p>Students who demonstrate understanding can:</p> <p><b>2-ESS2-2</b> Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]</p> <p><b>2-ESS2-3</b> Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p> <p><b>2-ESS1-1</b> Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions</p>	<p><b>Examples, Outcomes, Assessments</b>  <i>(see <a href="#">note</a> below about the content of this section)</i></p> <p>Instructional Focus:</p> <p>Sample Assessments:</p> <ul style="list-style-type: none"> <li>• Design Challenge Rubric</li> <li>• Modeling</li> <li>• Student Conversation</li> <li>• Journal Work</li> </ul> <p>Instructional Strategies:</p> <ul style="list-style-type: none"> <li>• Mini lecture utilizing multimedia presentation</li> <li>• Notetaking with words and sketches</li> <li>• Mini debates using collected evidence</li> <li>• Cooperative groupwork engaged in engineering design process</li> <li>• Lab activities observing, measuring, recording changes in matter and observing/describing properties of</li> </ul>

and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [

**2-ESS2-1** Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.\* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

Students will demonstrate understanding that:

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

**ESS2.C: The Roles of Water in Earth's Surface Processes**

Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

**ESS1.C: The History of Planet Earth**

Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1- 1)

**ESS2.A: Earth Materials and Systems**

Wind and water can change the shape of the land. (2-ESS2-1)

**ETS1.C: Optimizing the Design Solution**

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (*secondary to 2-ESS2-1*)

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Interdisciplinary Connections

ELA/Literacy

**RI.2.1** Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text. (2-ESS1-1)

**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1), (2-ESS2-1)

**RI.2.9** Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1), (2-ESS2-3)

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2- ESS1-1), (2-ESS2-3)

**SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

**MP.2** Reason abstractly and quantitatively. (2-ESS2-1), (2-ESS2-1), (2-ESS2-2)

**MP.4** Model with mathematics. (2-ESS1-1), (2-ESS2-1), (2-ESS2-2)

**MP.5** Use appropriate tools strategically. (2-ESS2-1)

	Technology Integration  Global Perspectives
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NOTE re: Examples, Outcomes and Assessments

*The following skills and themes should be reflected in the design of units and lessons for this course or content area.*

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy

**Grade 2/ Content Area: Unit 3 Ecosystems**

**Curriculum**

**Course Description:**

This unit is divided into three parts or “bends” that will help students understand that ecosystems are made up of plants and animals. These plants and animals have basic survival needs and many similarities and differences.

**Big Ideas: Course Objectives / Content Statement(s)**

By the end of this unit, students will be able to:

<b>Essential Questions</b>	<b>Enduring Understandings</b>
<p data-bbox="203 814 795 884"><i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <p data-bbox="203 932 690 1001">How do living things grow, thrive, and survive?</p> <p data-bbox="203 1039 750 1108">How are living things dependent upon one another?</p> <p data-bbox="203 1146 764 1182">Why are habitats important to living things?</p> <p data-bbox="203 1220 786 1255">How do animals and plants adapt to survive?</p>	<p data-bbox="828 814 1403 884"><i>What will students understand about the big ideas?</i></p> <ul data-bbox="876 932 1416 1854" style="list-style-type: none"><li>● Ecosystems are made up of climate, plants, soil, and animals. Within each ecosystem there is a relationship between living things and nonliving things. Energy can change from one form to another, starting with the Sun.</li><li>● Organisms have basic needs (animals need air, water and food; plants need air, water, nutrients and light) though the amount of these needs may vary.</li><li>● When the environment changes, plants and animals adapt, move or die. Each plant and animal adapts in their own way to their environment.</li><li>● Plants have specific adaptations to disperse their seeds.</li><li>● All animals depend on plants to survive (some animals eat plants; others eat animals that eat plants.) All ecosystems are affected by human interaction requiring conservation.</li><li>● Some organisms can survive in multiple ecosystems due to their adapting abilities.</li></ul>

**Areas of Focus: Proficiencies  
(Cumulative Progress Indicators)**

LS2.A: Interdependent Relationships in Ecosystems

Plants depend on water and light to grow.

(2-LS2-1) Plants depend on animals for pollination or to move their seeds around.

(2-LS2-2) ETS1.B: Developing Possible Solutions

Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary to 2-LS2-2)

**Examples, Outcomes, Assessments**

(see [note](#) below about the content of this section)

Instructional Focus:

- Investigate plant needs
- Investigate plant reproduction
- Investigate ecosystem plants and animals
- Investigate life cycle of a butterfly
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Sample Assessments:

- Design Challenge Rubric
- Modeling
- Student Conversation
- Journal Work

Instructional Strategies:

- Mini lecture utilizing multimedia presentation
- Notetaking with words and sketches
- Mini debates using collected evidence
- Cooperative groupwork engaged in engineering design process
- Lab activities observing, measuring, recording changes in matter and observing/describing properties of matter

**Interdisciplinary Connections**

ELA/Literacy –

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1) SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.

	<p>(2-LS2-2)</p> <p>Mathematics –</p> <p>MP.2 Reason abstractly and quantitatively. (2-LS2-1)</p> <p>MP.4 Model with mathematics. (2-LS2-1),(2-LS2-2)</p> <p>MP.5 Use appropriate tools strategically. (2-LS2-1)</p> <p>2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems. (2-LS2-2)</p> <p>Technology Integration</p> <p>Global Perspectives</p>
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NOTE re: Examples, Outcomes and Assessments

*The following skills and themes should be reflected in the design of units and lessons for this course or content area.*

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and  
Entrepreneurial Literacy

Civic Literacy

Health Literacy

Ecosystems, Relationships between living and nonliving things

## Grade 2/ Content Area: Unit 2 Processes that Shape the Earth

### Curriculum

#### Course Description:

This unit is divided into three parts or “bends” that will help students understand that the earth has dramatically different landscapes and geological features and that these unique landscapes are created by changes in the earth’s crust, weather and erosion cycles. Students will also learn that changes in the earth’s crust and it’s landscapes can occur both very quickly and very slowly over time. The final bend will challenge students to synthesize their knowledge and what they have learned from their experiences to use the engineering design process to design, test and present a solution for erosion at their school site or other given site.

#### Big Ideas: *Course Objectives / Content Statement(s)*

By the end of this unit, students will be able to:

- Describe what a cycle is and give examples.
- Describe events that have a beginning and an an end.
- Describe events that happen quickly.
- Describe events that happen very slowly.
- Explain how wind shapes the land.
- Explain how water shapes the land.
- Describe how wind erosion is reduced
- Describe how water erosion is reduced.
- Design, build, test and compare engineering solutions for preventing/limiting wind and water erosion.

<b>Essential Questions</b>	<b>Enduring Understandings</b>
<i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i>  Does the Earth’s surface change? What are ways that the Earth’s surface changes? What are the agents of change? Do changes in the Earth’s surface happen quickly or slowly? Can humans stop Earth’s surface from changing? Bend 1:	<i>What will students understand about the big ideas?</i>  <ul style="list-style-type: none"><li>● Be able to describe events occur in cycles, such as day and night.</li><li>● Identify events have a beginning and an end, like a volcanic eruption.</li><li>● Explain the impact of events can happen very quickly.</li><li>● Describe events can happen very slowly over a time period much longer than anyone can observe.</li></ul>

<ul style="list-style-type: none"> <li>• What causes the Earth to change?</li> <li>• Do all of Earth’s changes take the same amount of time to happen? Why or why not?</li> </ul> <p>Bend 2:</p> <ol style="list-style-type: none"> <li>1. What are the effects of wind &amp; water on the land?</li> <li>2. What are landforms that help prevent wind and water erosion?</li> <li>3. How does wind and water shape the land?</li> </ol> <p>Bend 3:</p> <ol style="list-style-type: none"> <li>4. How can the effects of wind and water erosion be controlled or reduced?</li> </ol> <p>How can man made materials/structures be used to impact the natural world?</p> <p>How do we use engineering design to solve problems involving erosion?</p>	<ul style="list-style-type: none"> <li>• What the effects of wind and water are on the land.</li> <li>• How wind erosion creates landforms</li> <li>• How water erosion creates landforms</li> <li>• Humans can use the engineering design process to test and compare simple solutions for preventing or limiting the effects of wind and water erosion</li> </ul>
<p><b>Areas of Focus: Proficiencies (Cumulative Progress Indicators)</b>  Students will:  <i>(Enter NJCCCS or Common Core CPI’s here)</i></p> <p>Students who demonstrate understanding can:</p> <p><b>2-ESS2-2</b> Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]</p> <p><b>2-ESS2-3</b> Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p> <p><b>2-ESS1-1</b> Use information from several sources to provide evidence that Earth events</p>	<p><b>Examples, Outcomes, Assessments</b>  <i>(see <a href="#">note</a> below about the content of this section)</i></p> <p>Instructional Focus:</p> <p>Sample Assessments:</p> <ul style="list-style-type: none"> <li>• Design Challenge Rubric</li> <li>• Modeling</li> <li>• Student Conversation</li> <li>• Journal Work</li> </ul> <p>Instructional Strategies</p> <ul style="list-style-type: none"> <li>• Mini lecture utilizing multimedia presentation</li> <li>• Notetaking with words and sketches</li> <li>• Mini debates using collected evidence</li> <li>• Cooperative groupwork engaged in engineering design process</li> </ul>

can occur quickly or slowly. [Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.]

**2-ESS2-1** Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.\* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

Students will demonstrate understanding that:

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

**ESS2.C: The Roles of Water in Earth's Surface Processes**

Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

**ESS1.C: The History of Planet Earth**

Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1- 1)

**ESS2.A: Earth Materials and Systems**

Wind and water can change the shape of the land. (2-ESS2-1)

**ETS1.C: Optimizing the Design Solution**

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (*secondary to 2-ESS2-1*)

- Lab activities observing, measuring, recording changes in matter and observing/describing properties of matter

Interdisciplinary Connections

ELA/Literacy

**RI.2.1** Ask and answer such questions as *who, what, where, when, why, and how* to demonstrate understanding of key details in a text. (2-ESS1-1)

**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1), (2-ESS2-1)

**RI.2.9** Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1), (2-ESS2-3)

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2- ESS1-1), (2-ESS2-3)

**SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

**MP.2** Reason abstractly and quantitatively. (2-ESS2-1), (2-ESS2-1), (2-ESS2-2)

**MP.4** Model with mathematics. (2-ESS1-1), (2-ESS2-1), (2-ESS2-2)

	<p><b>MP.5</b> Use appropriate tools strategically. (2-ESS2-1)</p> <p>Technology Integration</p> <p>Global Perspectives</p>
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NOTE re: Examples, Outcomes and Assessments

*The following skills and themes should be reflected in the design of units and lessons for this course or content area.*

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy

**Grade 2/ Content Area:** Unit 2 Processes that Shape the Earth

**Curriculum**

**Course Description:**

This unit is divided into three parts or “bends” that will help students understand that the earth has dramatically different landscapes and geological features and that these unique landscapes are created by changes in the earth’s crust, weather and erosion cycles. Students will also learn that changes in the earth’s crust and it’s landscapes can occur both very quickly and very slowly over time. The final bend will challenge students to synthesize their knowledge and what they have learned from their experiences to use the engineering design process to design, test and present a solution for erosion at their school site or other given site.

**Big Ideas:** *Course Objectives / Content Statement(s)*

By the end of this unit, students will be able to:

- Describe what a cycle is and give examples.
- Describe events that have a beginning and an an end.
- Describe events that happen quickly.
- Describe events that happen very slowly.
- Explain how wind shapes the land.
- Explain how water shapes the land.
- Describe how wind erosion is reduced
- Describe how water erosion is reduced.
- Design, build, test and compare engineering solutions for preventing/limiting wind and water erosion.

<b>Essential Questions</b>	<b>Enduring Understandings</b>
<p><i>What provocative questions will foster inquiry, understanding, and transfer of learning?</i></p> <p>Does the Earth’s surface change? What are ways that the Earth’s surface changes? What are the agents of change? Do changes in the Earth’s surface happen quickly or slowly? Can humans stop Earth’s surface from changing? Bend 1: • What causes the Earth to change?</p>	<p><i>What will students understand about the big ideas?</i></p> <ul style="list-style-type: none"><li>● Be able to describe events occur in cycles, such as day and night.</li><li>● Identify events have a beginning and an end, like a volcanic eruption.</li><li>● Explain the impact of events can happen very quickly.</li><li>● Describe events can happen very slowly over a time period much longer than anyone can observe.</li><li>● What the effects of wind and water are on the land.</li></ul>

<p>• Do all of Earth's changes take the same amount of time to happen? Why or why not?</p> <p>Bend 2:</p> <ol style="list-style-type: none"> <li>1. What are the effects of wind &amp; water on the land?</li> <li>2. What are landforms that help prevent wind and water erosion?</li> <li>3. How does wind and water shape the land?</li> </ol> <p>Bend 3:</p> <ol style="list-style-type: none"> <li>4. How can the effects of wind and water erosion be controlled or reduced?</li> </ol> <p>How can man made materials/structures be used to impact the natural world?</p> <p>How do we use engineering design to solve problems involving erosion?</p>	<ul style="list-style-type: none"> <li>• How wind erosion creates landforms</li> <li>• How water erosion creates landforms</li> <li>• Humans can use the engineering design process to test and compare simple solutions for preventing or limiting the effects of wind and water erosion</li> </ul>
<p><b>Areas of Focus: Proficiencies (Cumulative Progress Indicators)</b>  Students will:  <i>(Enter NJCCCS or Common Core CPI's here)</i></p> <p>Students who demonstrate understanding can:</p> <p><b>2-ESS2-2</b> Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]</p> <p><b>2-ESS2-3</b> Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p> <p><b>2-ESS1-1</b> Use information from several sources to provide evidence that Earth events can occur quickly or slowly. [Clarification Statement: Examples of events and</p>	<p><b>Examples, Outcomes, Assessments</b>  <i>(see <a href="#">note</a> below about the content of this section)</i></p> <p>Instructional Focus:</p> <p>Sample Assessments:</p> <ul style="list-style-type: none"> <li>• Design Challenge Rubric</li> <li>• Modeling</li> <li>• Student Conversation</li> <li>• Journal Work</li> </ul> <p>Instructional Strategies</p> <ul style="list-style-type: none"> <li>• Mini lecture utilizing multimedia presentation</li> <li>• Notetaking with words and sketches</li> <li>• Mini debates using collected evidence</li> <li>• Cooperative groupwork engaged in engineering design process</li> <li>• Lab activities observing, measuring, recording changes in matter and</li> </ul>

timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.]

**2-ESS2-1** Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.\*  
[Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

Students will demonstrate understanding that:

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

**ESS2.C: The Roles of Water in Earth's Surface Processes**

Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

**ESS1.C: The History of Planet Earth**

Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1- 1)

**ESS2.A: Earth Materials and Systems**

Wind and water can change the shape of the land. (2-ESS2-1)

**ETS1.C: Optimizing the Design Solution**

Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (*secondary to 2-ESS2-1*)

observing/describing properties of matter

Interdisciplinary Connections

ELA/Literacy

**RI.2.1** Ask and answer such questions as *who, what, where, when, why, and how* to demonstrate understanding of key details in a text. (2-ESS1-1)

**RI.2.3** Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1), (2-ESS2-1)

**RI.2.9** Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

**W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1), (2-ESS2-3)

**W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)

**W.2.8** Recall information from experiences or gather information from provided sources to answer a question. (2- ESS1-1), (2-ESS2-3)

**SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

**MP.2** Reason abstractly and quantitatively. (2-ESS2-1), (2-ESS2-1), (2-ESS2-2)

**MP.4** Model with mathematics. (2-ESS1-1), (2-ESS2-1), (2-ESS2-2)

	<p><b>MP.5</b> Use appropriate tools strategically. (2-ESS2-1)</p> <p>Technology Integration</p> <p>Global Perspectives</p>
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NOTE re: Examples, Outcomes and Assessments

*The following skills and themes should be reflected in the design of units and lessons for this course or content area.*

21st Century Skills:

Creativity and Innovation

Critical Thinking and Problem Solving

Communication and Collaboration

Information Literacy

Media Literacy

Life and Career Skills

21st Century Themes (as applies to content area):

Financial, Economic, Business, and Entrepreneurial Literacy

Civic Literacy

Health Literacy